(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number : **0 581 601 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number : **93306027.9**

(22) Date of filing : **30.07.93**

(51) Int. Cl.[5] : **H04N 7/087**, H04N 5/92, G11B 27/30

(30) Priority : **31.07.92 KR 9213756**

(43) Date of publication of application : **02.02.94 Bulletin 94/05**

(84) Designated Contracting States : **DE FR GB**

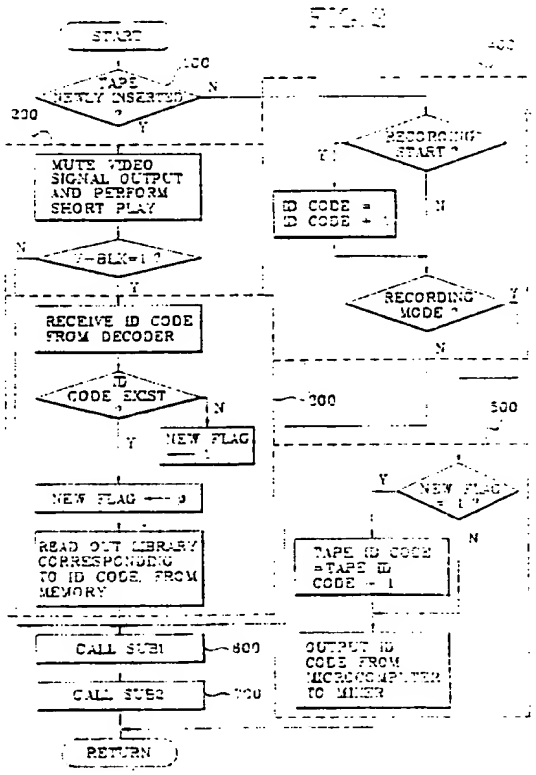
(71) Applicant : **SAMSUNG ELECTRONICS CO., LTD.**
416 Maetan-3 Dong, Paldal-ku
Suwon-city, Kyungki-do 441-373 (KR)

(72) Inventor : **Yoo, Jae Chern**
1074-24, Toksan 2-dong, Kuro-gu
Seoul (KR)

(74) Representative : **Read, Matthew Charles et al**
Venner Shipley & Co. 20 Little Britain
London EC1A 7DH (GB)

(54) Video recording and/or reproducing system.

(57) A video recording or reproducing system such as a VCR or camcorder is provided with an indexing system for recorded programs. Identification codes (ID) for individual recorded programs are recorded in the vertical blanking periods for the recorded video signals, which are detected by a decoder (50). The codes are stored in a memory (50) and programs can be selected from a video tape from an on-screen display of the memory contents for a particular tape. Individual ID codes for a new tape and newly recorded programs are produced by a microcomputer (90) to be recorded concurrently with signals being recorded, during the vertical blanking periods.



EP 0 581 601 A1

The present invention relates to a video recording and/or reproducing system, with a video index function such as video cassette recorders (VCRs) and camcorders.

In order to find a particular portion or program from recorded contents of a video tape, a video index search system (VISS) and a video address search system (VASS) have been employed hitherto in VCRs and camcorders. Also, a classification label may be attached to the video tape. VISS is utilised to facilitate the search of recorded contents of a video tape during playing thereof, by storing a specific index signal on a control track of the video tape at the start point of recording. VASS facilitates searching of recorded contents of a video tape during playing thereof by storing a specific index address on a control track on the video tape at the start pooint of recording. The specific address corresponds to a location on the video tape at which the recording begins, and value of the specific address varies according to the recording position along the length of the tape.

However, VISS and VASS suffer from the following problems.

In VISS, the same index signal is recorded at the start of each recorded program, so the video tape must be played from its beginning to the end for searching the desired content. In VASS, a fixed address can be utilised when the exact position of the desired content from the start point of the search is already determined, but, when the position of the desired content is not definite, the search must be performed from the start point of the search to the end of the video tape or performed after rewinding the video tape. If a desired picture is not then displayed, the unsearched portion must be search. Consequently, all data recorded on the video tape usually needs to be searched.

Broadly stated, the present invention provides a video recording and/or reproducing system including means for recording on and/or reproducing from a recording medium, video signals corresponding to a plurality of programs together with identification codes (ID) concerning the programs, characterised in that the identification codes are recorded in prdetermined blanking periods of the video signals.

To search the recorded contents on a video tape, the present invention employs a video library system (hereinafter referred to as "VLS") which does not adopt the VISS, VASS or labelling of the video tape. The VLS stores information data on the video tape to inform the user of information data about the video tape. In more detail, when one video tape from several tapes is inserted into a set (e.g. VCR), information designating the particular inserted tape and program information registered by the user during recording, are displayed to inform the user of the location of the recorded tape content. The tape can be recorded or played on the basis of the displayed information, using a remote controller or key board installed on the set.

A similar technique for recording and playing message data in a vertical blanking period is disclosed in US Patent No. 5 097 348 but this, however, relates only to a superimposition function.

The invention thus provides a video library system for recording or playing an index (ID) code indicating information about the video tape in a vertical blanking period of a video signal to enable a user to search a desired picture without using the VISS or VASS.

Features and advantages of the present invention will become more apparent from the following detailed description of a preferred embodiment thereof, with reference to the accompanying drawings in whch:

Figure 1 is a block diagram of a video library system according to the present invention;

Figue 2 is a flow chart of a method of carrying out the present invention ;

Figures 3A to 3E are flow charts for showing the subroutine and supplemental steps of the method according to Figure 2;

Figure 4 illustrates states displayed on a screen during a library operation; and

Figure 5A and 5B are waveforms showing horizontal and vertical sync signals, respectively.

Referring to Figure 1 a composite video signal is received via an adder 80 from an exernal video signal source (not shown), e.g. a video signal input line and tuner. A microcomputer 90 is connected to a sync signal separator 20 for separating a horizontal sync signal H-sync and a vertical sync signal V-sync from the composite video signal. The microcomputer 90 is also connected to an index separator unit consisting of a data slicer 30 and a decoder 40.

The microcomputer 90 counts the horizontal sync signals H-sync and veritcal sync signals V-sync. By this counting operation, a vertical blanking period is determined, and in accordance with the invention, the blanking period includes ID information a tape ID code designating the tape number and a parogram ID code designating a start point of the recording. The microcomputer 90 outputs a vertical blanking signal V-BLK corresponding to the vertical blanking period which contains the ID information to facilitate reproduction of the ID information.

When the vertical blanking signal V-BLK determined as above is output from the micromputer 90 to the data slicer 30, ID information stored during the recording is separated in the data slicer 30 from the composite video signal that is received from the adder 80, by means of the vertical blanking signal V-BLK. The decoder 40 is connected to the data slicer 30 to decode the separated ID information into a signal form recognisable by the microcomputer 90.

The microcomputer 90 is also connected to the

following components: a memory 50 for storing a library corresponding to the ID code which increases one by one per recording, a motor 55 driven by a control voltage and a control signal F/R from the microcomputer 90, and a key board 10 with keys for controlling the microcomputer 90, such as a search key, a clear key, a library on/off key and character keys. An amplifier is connected to the microcomputer 90 for amplifying an remote-control signal.

The microcomputer 90 is further connected to an on-screen display (OSD) 60 for displaying the ID code and library corresponding to the ID code extracted from the memory 50 in response to the input by the key board 10. The OSD 60 is connected to a mixer 70 whch combines the composite video signal from the adder 80 with an on screen display signal from the OSD 60 to thus output the result of the combination. A white or colour signal for controlling colour of characters displayed on the screen is received from one side of the mixer 70.

Therefore, the microcomputer 90 extracts the ID information or library corresponding to the ID tape code from the memory 50 to ouput the extracted library to the OSD 60. the on-screen display signal from the OSD 60 is supplied to the mixer 70 to be combined with the composite video signal from the video signal source to display the ID information on the screen. At this time, the white or colour signal input to the mixer 70 controls the colour of the displayed portion on the screen and an embodying technique which is known per se and this will not be described herein. The ID information displayed via the OSD 60 is illustrated in Figure 4, which will be explained later in the description with reference to Figures 2 and 3.

The user may play, clear or change the displayed program ID code by selecting a desired library and using various functional keys on the key board 10 such as the search key, clear key, character keys and library on/off key.

In the case of a new tape which has no information thereon, the ID code on the tape cannot be extracted from the memory since the memory 50 has no ID code in respect of the new tape. However, the microcomputer 90 automatically outputs a tape ID code from its ID code output terminal IDo, and the tape ID code is combined with the external composite video signal (e.g. a television broadcasting signal) in the adder 80. The tape ID code is also stored in the memory 50. At this time, the tape ID code and a program ID code are recorded, with the program code in a format of 0001 as shown in Figure 4. In case that the tape is not a new one, an ID code is extracted from the memory and fed to the microcomputer 90 since the ID code is already stored in the memory 50, the extracted program ID code is increased by one, and the tape ID code is left unchanged. Thus, the increased program ID code is combined with the external composite video signal to be recorded, and the increased program ID code is also recorded in the memory 50. The reason for increasing the program ID code by one is in that the program ID code is increased upon recording whereas the tape ID code is changed only in the case of a new tape.

According to the present invention as described above, the tape ID code and program ID ID code are recorded or reproduced in the vertical blanking period of the video signal, thereby enabling the search of the library of the video tape to be achieved without the need to carry out a time consuming searchof the entire tape as with the prior VISS or VASS systems

Operation of the apparatus having the above stated construction will be described in detail with reference to Figures 2 and 3A to 3E.

Figure 2 is a flow chart for a method embodying a video library system according to the present invention. Here, upon insertion of a video tape, ID information or a library corresponding to the tape is displayed on the screen, or an ID code is combined with the external composite video signal to be recorded.

In step 100, the microcomputer 90 determines whether a video tape is newly inserted or not. In step 200, when the video tape is newly inserted, the microcomputer 90 mutes a video signal ouput and automatically performs a short play to check whether a vertical blanking period having the ID codes exists or not. If the vertical blanking period exists in step 200, in step 300, the ID code separated from the composite video signal by means of the vertical blanking signal from the micromputer 90 is decoded in the decoder 40 to be input to the microcomputer 90 which in turn confirms the existence of the ID code in the signal received from the decoder 40. If there is no ID Code, the tape is regarded as a new one, so that a new flag is set to one. Contrarily, if there is an ID code, the tape is regarded as a used one so that the new flag is set to zero and then the content of the library corresponding to the ID Code input from the decoder 40 to the micromputer 90 is read out from the memory 50.

When the video tape is not newly inserted one in step 100, step 400 is performed. In step 400 if recording on the tape is to be started, the program ID code is increased by one, and the mode is checked whether it is of a recording or not. When it is determined that the mode is the recording mode in step 400, in step 500, the new flag is checked whether it is set to one. If the new flag is set to one, the tape ID code is increased by one by regarding the tape being a new one. Whereas, if the new flag is not set to one, which means that the tape is not a new one, the tape ID code is not increased and the ID code is output from the microcomputer 90 to the mixer 70 for the on-screen display.

If the vertical blanking period ID code does not exist in step 200, the mode is not of recording, or the step 300 is carried out, an on-screen display subroutine (hereinafter referred to as SUB1) is called for dis-

playing the library corresponding to the tape ID code according to a key-input, in step 600. After performing step 600, a current program ID code and a program ID code selected by the user are compared with each other in according with the input of the search key, and the motor 55 is controlled in response to the result of the comparison. Thus, in step 700, a first search subroutine (hereinafter referred to as SUB2) is called.

Figures 3A to 3E are flow charts showing the subroutines and supplemental steps of the method according to Figure 2.

Figure 3A is a flow chart of the SUB1 of step 600 shown in Figure 2. In step 610, the input key is checked whether it is a library key showing the ID information or not. Here, when the input key is determined as the library key, in step 620, the library-on state (i.e., the on-screen display of the library) is confirmed. Thereafter, the OSD is cleared so as to turn off the library display in the case of the library-on state, of the content of the library of the currently loaded tape is displayed on the screen.

When the library-key input is not checked in step 610, in step 630, the library-on state is confirmed. In case of the library-on state, an arrow-key input is checked. When the input key is determined to be an arrow key in step 630, in step 640, a cursor on the OSD displaying the title of the program corresponding to the ID code shown in Figure 4 is moved in a direction defined by the arrow key.

If the input key is not the arrow key in step 630, the input key is checked whether it is a character key or not in step 650. If the character-key input is confirmed, a corresponding character is output by means of the cursor in step 660. If the character key is not input in step 650, in step 670, clear key input is checked, so that the portion currently indicated the cursor on the corresponding line can be cleared. After performing the above-described steps, the subroutine SUB2 shown in Figure 2 is carried out.

Figure 3B is a flow chart showing SUB2 of step 700. After confirming the SUB1 of step 600 shown in Figure 3A, SUB2 is called in step 700. Therefore, by the input of the search key, the current program ID code and the ID code selected by the user are compared with each other to control the drive of the motor 55, thereby executing a play operation.

In more detail, when step 710 determines that the input key is the search key for selecting a desired program from the on-screen display, in step 720, the library-on state is confirmed. Then, in case of the library -on state, the current ID code is compared with the ID code selected by the user by means of the search key. Thus, when they are the same, the tape is played.

If the current ID code and the ID code selected by the user to be searched are not the same in step 720, a tape length corresponding to the time difference between the recording time of a program with the current ID code, and the recording time of a program recorded on the selected ID code, is calculated in step 730. In order to speed up program selection, the tape is run at high speed until close to the selected praogram, with the tape in an unloaded state, and then at normal speed in a loaded state. To this end, in step 740, the time diference is compared with a predetermined value, so that the tape is fully loaded when the time difference is smaller than the predetermined value, or is unloaded when it is greater than the predetermined value. Referring to Figure 4, assuming that the current program ID code is 0001 corresponding to PROGRAM-1, and the program ID code selected by the search key is 0003 for PROGRAM-3, the time difference from the current ID code to the ID code to be search is two hours because the PROGRAM-1 is one hour long from 10:00 to 11:00 and PROGRAM-2 whose ID code is 0002 is one hour long from 8:00 to 9:00. Accordingly, the time difference from the beginning of the program having code 0001 to the start of the program for ID code 0003 (PROGRAM-3) is two hours. The tape is according fast forwaded for a tape length corresponding to say one hour and fifty minutes, in an unloaded condition in order to prevent the tape and tape head from being damaged, and to avoid the time lapse that would be caused by forwarding the tape in the fully loaded state. Thus, the selected program is searched by forwarding the tape in the fully loaded state in the case of a small time difference between the program corresponding to the current program ID code and the program corresponding to the selected program ID code. But, if the time difference is great, the tape travel is initially performed in an unloaded state and then changed to be the fully loaded state to search the desired program. The predetermined value selected for step 740 determines when the search switches from the initial searching in the unloaded state, to the final searching in the loaded state.

After performing step 740, the value of the current ID code is compared with that of the selected ID code in step 750. If the current ID code is smaller than the selected ID code this means that the position of the selected ID code precedes the current ID code and thus the motor 55 needs to wind the tape foward until reaching the portion to be searched. However, if the current ID code is larger or equal to the selected ID code, this means that the selected ID code is disposed after the current ID code, and thus the motor 55 needs to rewind the tape until reaching the portion to be searched.

If step 710 determines that the input key is not the search key, a second search subroutine (hereinafter referred to as SUB3) is called in step 760 to check the existence of the sync signal, performing an operation according to the result of step 710.

Figure 3C is a flow chart showing the SUB3 of

Figure 3B. The existence of the sync signal is checked in step 761. When the sync signal is not detected, it is determined whether the current ID code is the final code or not in step 762. Here, the non-existence of the sync signal denotes that nothing is displayed on the screen. If the result of step 762 indicates that the current program ID code is the final program ID code, i.e. indicating the final program recorded on the tape, the tape is rewound, otherwise a high-speed search is performed in step 764. Meanwhile, if the sync signal exists in step 761, the search is performed for determining the existence of the program ID code beyond the current position of the tape in step 765. Therefore, when the ID code exists, in step 766, the recorded content is reproduced and the search is finished.

In addition to the sequential operation described heretofore with reference to Figures 2A and 3A to 3C, an abruptly occurring horizontal or vertical interrupt can be processed as illustrated in Figure 3D and 3E, respectively, which will be explained with rreference to Figures 5A and 5B.

First, as shown in Figure 3D, the interrupt with respect to the vertical sync signal V-sync is processed as below. In step 801, the interrupt is checked whether it occurs at the start point of the vertical sync signal or not. When a point indicated by VPI of Figure 5B is determined as the start point of the vertical sync signal in step 801, the horizontal sync signal is set to zero to inhibit further counting of the horizontal sync signal since the vertical blanking period may include an ID code. When an interrupt does not occur at the start point of the vertical sync signal in step 801, the interrupt is checked again whether it occurs at the end point of the vertical sync signal, i.e. a point indicated by VPO in Figure 5B, in step 803. When the point is determined as the end of the vertical sync signal, there is no need to count the horizontal sync signal due to the fact that the video signal follows the end of the vertical sync signal. Accordingly, the horizontal sync signal is set to zero to inhibit further counting of the horizontal sync signal, and then the operating having been performed before the occurrence of the interrupt, is continued.

An interrupt with respect to the horizontal sync signal is processed as below. In step 811, the interrupt is checked whether it occurs at the start point of the horizontal sync signal designated by HPI in Figure 5A or not. Thus, when the interrupt occurs at the start point of the horizontal sync signal, the horizontal sync signal is increased by one so as to search a portion having the ID code in step 812. In step 813, the interrupt is checked whether it occurs during the vertical sync signal period corresponding to a section A in Figure 5A. When the vertical sync period is confirmed in step 813, in step 814, the counted value of the horizontal sync signal is compared with a predetermined value in order to confirm the counted value of the horizontal sync signal to be included in the vertical blanking period having the ID code. When the counted value is greater than or equal to the predetermined value, a vertical blanking erasing signal is output to the data slicer 30, in step 815. If not, in step 816, the vertical blanking signal is not output to the data slicer 30 but the operation having been performed before the occurrence of the interrupt is continued.

According to the present invention as described above, the horizontal and vertical sync signals are separated from the composite video signal, and the microcomputer 90 counts the sync signal to output the vertical blanking signal loading the ID code to the data slicer 30 during recording, so that the data slicer 30 separates the ID code from the composite video signal to output the separated ID code to the decoder 40. Following this operation, the decoder 40 decodes and outputs the ID code as a signal recognisable by the microcomputer 90 which in turn extracts a library corresponding to the ID code recorded during the recording from the memory 50 and then outputs the extracted library to the OSD 60. The on-screen display signal from the OSD 60 is combined with the composite video signal from the adder 80 in the mixer 70 and the result of the combination is output to be reproduced on the screen. The tape ID code and ID code displayed on the screen by means of the on-screen display signal are selected, cleared or stored again by means of various functional keys on the key board 10.

On the other hand, during recording, the microcomputer 90 extracts the program ID code stored in the memory 50 to increase the ID code by one, and the result is output to the adder 80 to be combined with the externally input composite video signal and recorded. Therefore, the ID information including tape ID code and program ID code can be recorded or played during the vertical blanking period.

As a result, by recording and playing the tape ID information comprising tape ID code and program ID code in the vertical blanking period, the video library system can be embodied without adopting VISS, VASS or a label.

When the present invention has been particularly shown and described with reference to particular embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be effected herein without departing from the scope of the invention as defined by the appended claims.

Claims

1. A video recording and/or reproducing system including means for recording on and/or reproducing from a recording medium, video signals corresponding to a plurality of programs together with identification codes (ID) concerning the pro-

grams, characterised in that the identification codes are recorded in predetermined blanking periods of the video signals.

2. A system according to claim 1, wherein the identification codes are recorded in vertical blanking periods of the video signals.

3. A system according to claim 1 or 2 operable with a plurality of individual recording media, wherein the identification codes include information which identifies the medium concerned, and including means for detecting the information that identifies the medium concerned.

4. A system according to claim 3 including memory means (50) for storing the identification codes for the individual media together with the codes for the programs stored on the individual media.

5. A system according to claim 4 including selecting means for selecting particular programs on the basis of the data held by the memory.

6. A system according to claim 5 including means for displaying contents of the memory and for selecting a program on the basis of data in the display thereof.

7. A system according to claim 5 or 6 wherein said medium comprises a magnetic tape, including means for comparing the code from the tape with the selected code, and moving the tape to search for the selected program on the basis of said comparison.

8. A video library system capable of searching content desired by a user by recording index information in a composite video signal loaded on a video tape during a vertical blanking period and reproducing the recorded index information, comprising:
sync signal separate for separating a vertical sync signal and a horizontal sync signal from said composite video signal;
a microcomputer for determining said vertical blanking period including said index information recorded therein by counting said horizontal sync signal separated by means of said sync signal separator, outputting the index information to be recorded in said vertical blanking period of said composite video signal, outputting data for displaying said index information on a screen and outputting a plurality of control signals for performing a search oepration;
memory means for storing a library corresponding to said ind information processed in said microcomputer to input and output said library;
index separator for separating to decode said index information loaded in said vertical blanking period supplied from said microcomputer, and outputting the decoded signal to said microcomputer;
a motor for driving said video tape for search said index informatin recorded on said video tape in response to the control signal from said microcomputer;
adder for adding said index information from said microcomputer to said composite video signal from a plurality of video signal input sources, and outputting the results of addition; and
on-screen display for combining said index information and library from said microcomputer with said composite video signal from said adder, and outputting the result of the combination.

9. The video library system as claimed in claim 1, wherein said index separator comprises:
a data slicer for separating said index information output from said microcomputer by being inserted during said vertical blanking period from said composite video signal received from said adder; and
a decorder for decoding said index information separated in said data slicer to be a signal recognisable to said microcomputer.

10. A method for emobidying a video library system for recording and reproducing index information formed of a tape index code and an index code and stored in a vertical blanking period of a video signal, and selecting a desired vbideo signal by confirming a library corresponding to said index informatin by a user, comprising the steps of:
checking the insertion of a new video tape;
detecting said vertical blanking period from said video signal when said video tape is newly isnerted;
checking the existence of said index code in a vertical blanking signal of said vertical blanking period when said vertical blanking period is detected, and reading out said library corresponding to said index from said microcomputer;
checking the start of recording when said video tape is not newly inserted, and checking a mode whether it is of a recording or not after increasing said index code when the start of recording is confirmed;
checking the insertion of a new video tape when said mode is of said recording, and outputting said index code for displaying on a screen after increasing said tape index code when said vieo tape is the new one;
displaying said library on said screen during performing the above-described steps in all case that said vertical blanking period is not detected,

said mode is not of said recording regardless of inserting a used video tape, and said library corresponding to said index code is already read out by said microcomputer; and
searching the video signal corresponding to the received index code, after confirming the content of said library displayed on said screen.

11. The method for embodying a video library system as claimed in claim 5, wherein said vertical blanking period is detected by performing a short play of said video signal in said step of detecting said vertical blanking period.

12. The metod for embodying a video library system as claimed in claim 10, wherein said step of displaying said library on said screen comprises the steps of:
checking a library key input;
confirming a library on state when said library key is input, for clearling the on-screen display and turning off the library on function in case of the library on state, and displaying the content of said library of a currently loaded video tape in case of the library off state;
checking said library-on state when said input key is not said library key, and checking an arrow-key input when said library on state is confirmed;
moving a cursor on said on-screen display when said arrow key input is confirmed, and checking a character-key input when said input key is not said arrow key;
outputting a character indicated by said cursor when said character key input is confirmed; and
checking a clear key input when said input key is not said character key, and clearing a portion of the corresponding line on which said cursor is placed when said clear key input is confirmed.

13. The method for embodying a video library system as claimed in claim 10, wherein said step of searching said video signal corresponding to said index code comprises the steps of:
checking a search key input;
checking said library on state when said search key input is confirmed, reproducing a current video signal when a current index code is the same as a selected index code;
calculating time difference from the positon of said current index code to the positon of said selected index code when said current index code is not the same as said selected index code;
comparing the calculated time difference with a predetermined value, fully loading said video tape when said calculated time difference is equal to or smaller than said predetermined value, and unloading said video tape when said calculated time difference is larger than said predetermined value;
comparing the index code detected during performing the full-loading or unloading operation of said vide tape with said selected index code, and
winding said video tape until reaching a selected portion to be searched in accordance with the result of the comparison; aand
checking the existence of said sync signal to perform an operation according to the result of the checking when said search key is not input.

14. The method for embodying a video library system as claimed in claim 13, wherein said step of checking the existence of said sync signal to perform said operation according to the result thereof comprises the steps of:
checking the existence of said sync signal;
determining whether said current index code is the finalc ode or set when there is no sync signal, and performing a high-speed search when said current index code is not the final code;
checking the existence of said index code in the succeeding portion of said video tape when said sync signal exists; and
playing said video tape when said index code exists on said succeeding portion thereof, and finishing said search operation.

FIG. 1

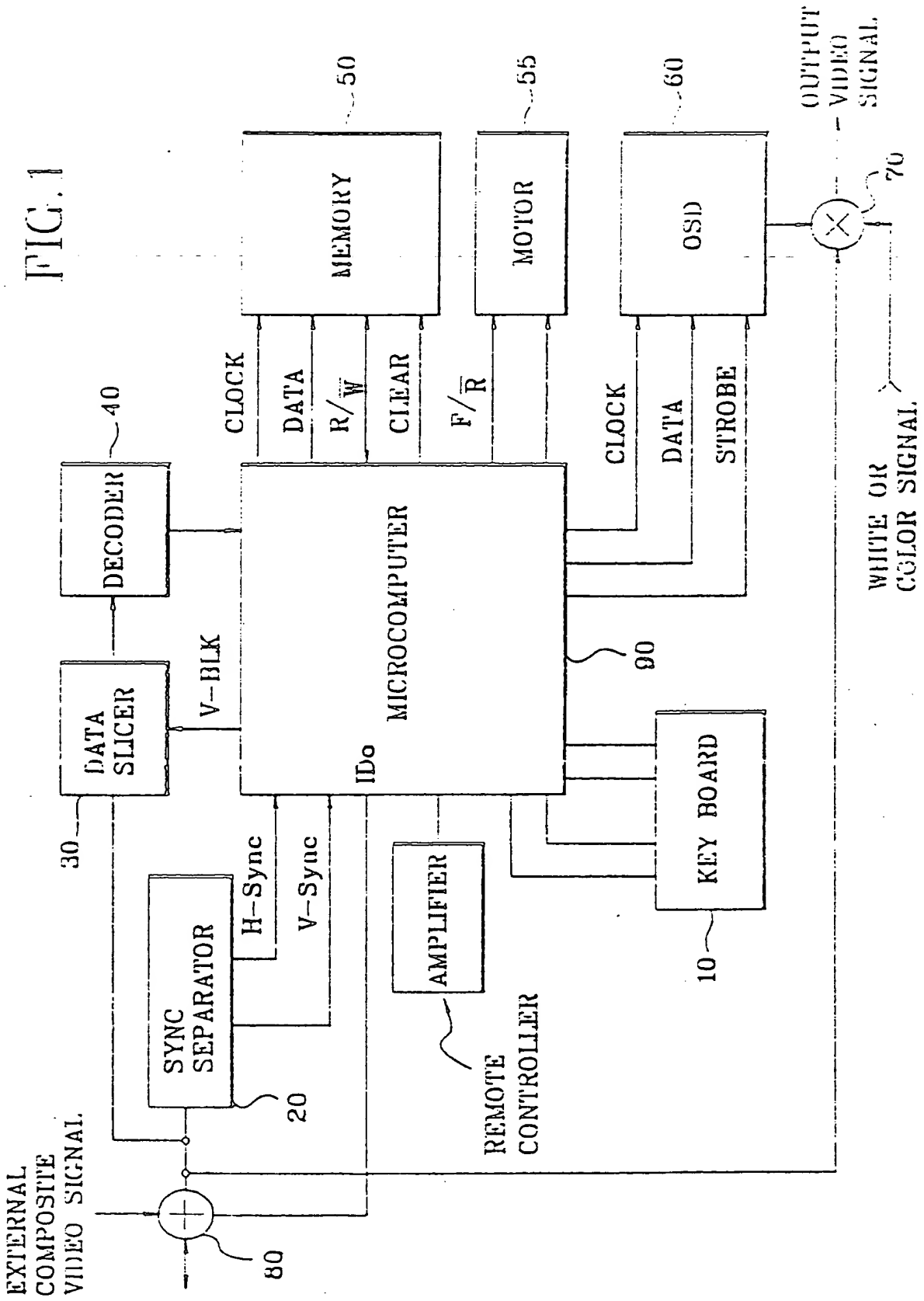

EXTERNAL COMPOSITE VIDEO SIGNAL
80
SYNC SEPARATOR
20
H-Sync
V-Sync
DATA SLICER
30
DECODER
40
V-BLK
MICROCOMPUTER
IDo
CLOCK
DATA
R/W
CLEAR
F/R
MEMORY
50
MOTOR
55
CLOCK
DATA
STROBE
OSD
60
90
AMPLIFIER
REMOTE CONTROLLER
KEY BOARD
10
WHITE OR COLOR SIGNAL
70
OUTPUT VIDEO SIGNAL

FIG. 2

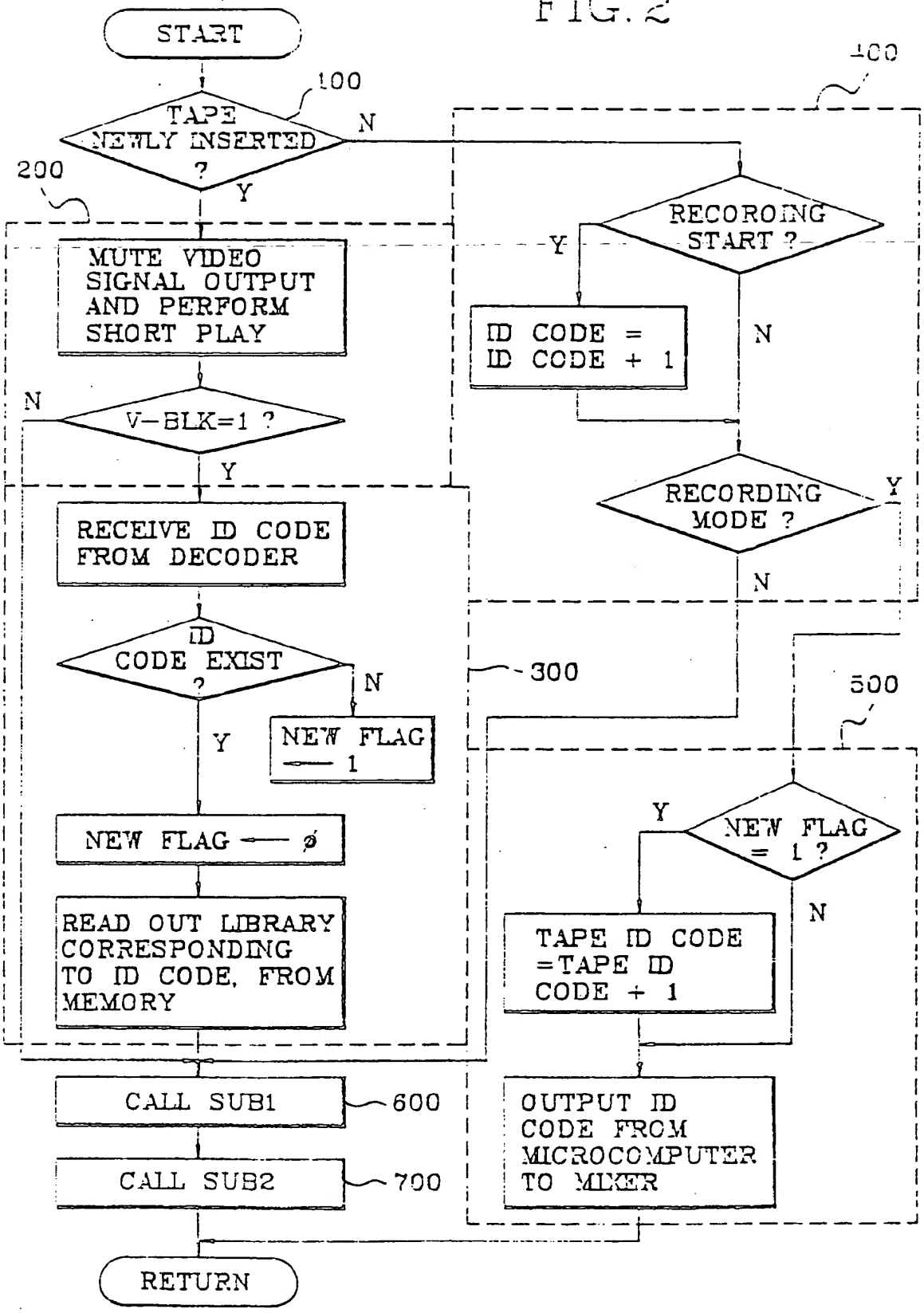

START
100
TAPE NEWLY INSERTED ?
N
Y
200
MUTE VIDEO SIGNAL OUTPUT AND PERFORM SHORT PLAY
N
V-BLK=1 ?
Y
RECEIVE ID CODE FROM DECODER
ID CODE EXIST ?
N
Y
NEW FLAG ← 1
NEW FLAG ← ø
READ OUT LIBRARY CORRESPONDING TO ID CODE, FROM MEMORY
CALL SUB1
600
CALL SUB2
700
RETURN
400
RECORDING START ?
Y
ID CODE = ID CODE + 1
N
RECORDING MODE ?
Y
N
300
500
NEW FLAG = 1 ?
Y
N
TAPE ID CODE =TAPE ID CODE + 1
OUTPUT ID CODE FROM MICROCOMPUTER TO MIXER

FIG. 3A

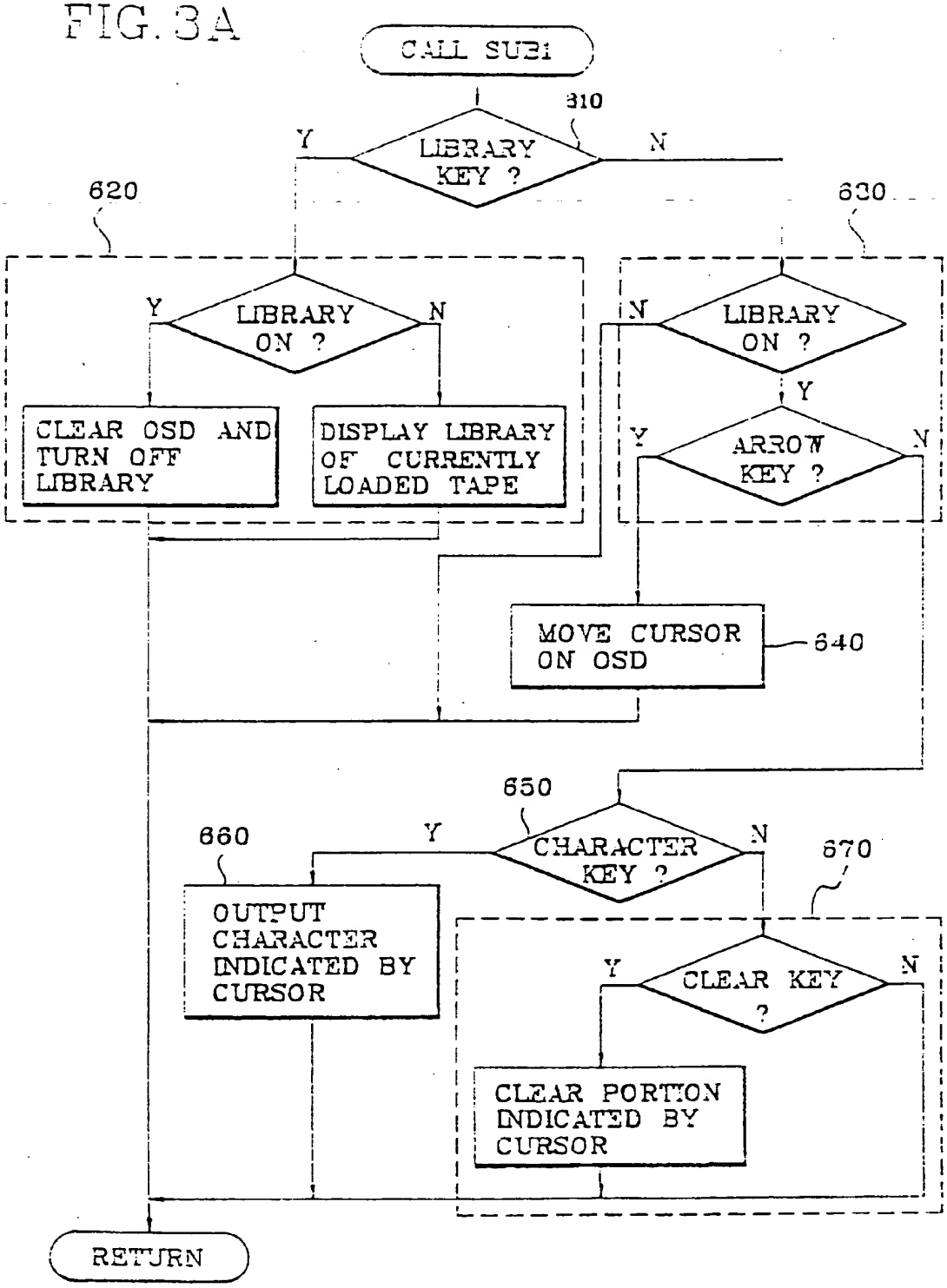

CALL SUB1
310
LIBRARY KEY ?
Y
N
620
630
LIBRARY ON ?
Y
N
CLEAR OSD AND TURN OFF LIBRARY
DISPLAY LIBRARY OF CURRENTLY LOADED TAPE
LIBRARY ON ?
N
Y
ARROW KEY ?
Y
N
MOVE CURSOR ON OSD
640
650
CHARACTER KEY ?
Y
N
660
OUTPUT CHARACTER INDICATED BY CURSOR
670
CLEAR KEY ?
Y
N
CLEAR PORTION INDICATED BY CURSOR
RETURN

FIG. 3B

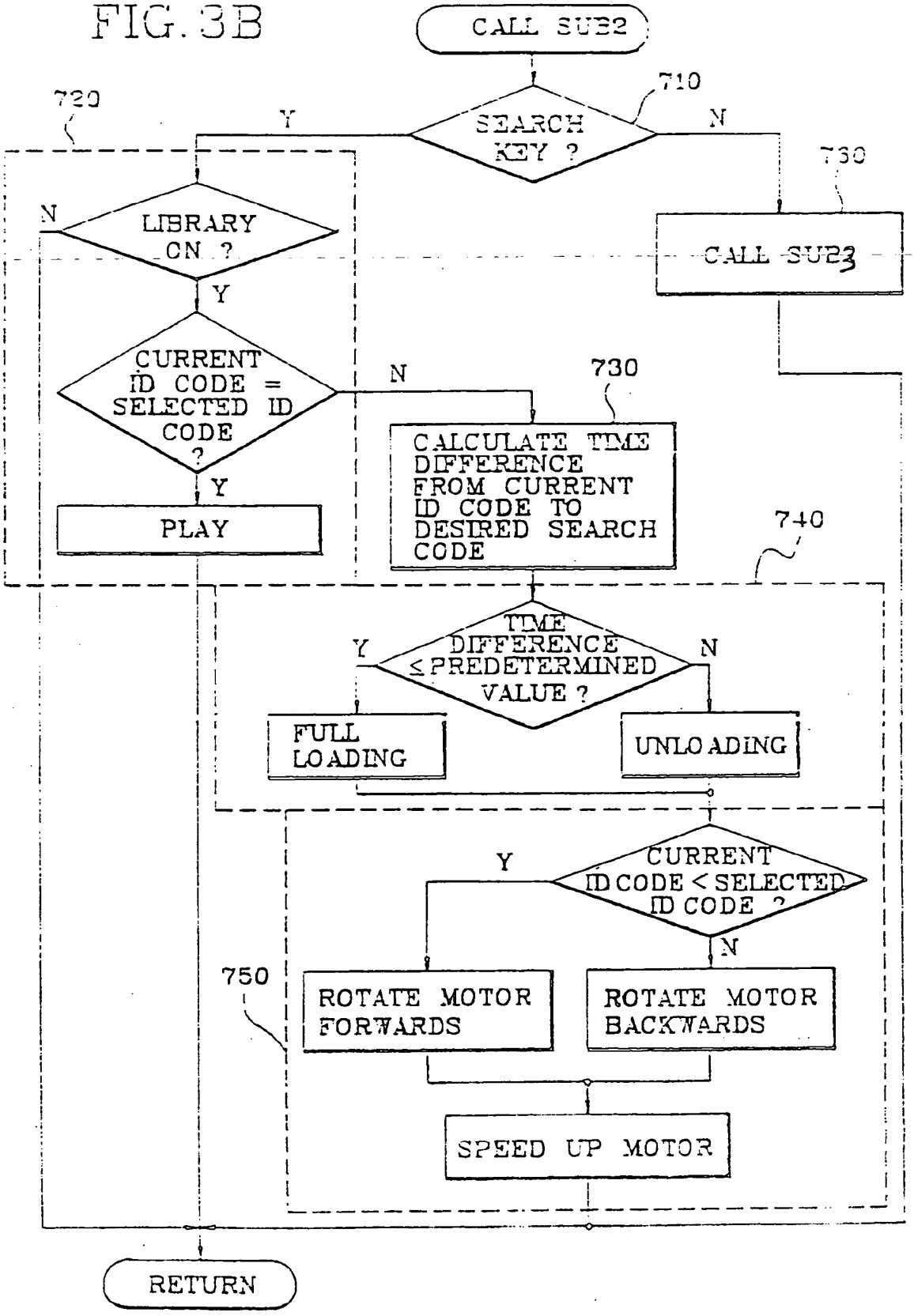

CALL SUB2
710
SEARCH KEY ?
Y
N
720
730
LIBRARY CN ?
N
Y
CALL SUB3
CURRENT ID CODE = SELECTED ID CODE ?
N
730
Y
PLAY
CALCULATE TIME DIFFERENCE FROM CURRENT ID CODE TO DESIRED SEARCH CODE
740
TIME DIFFERENCE ≤ PREDETERMINED VALUE ?
Y
N
FULL LOADING
UNLOADING
CURRENT ID CODE < SELECTED ID CODE ?
Y
N
750
ROTATE MOTOR FORWARDS
ROTATE MOTOR BACKWARDS
SPEED UP MOTOR
RETURN

FIG. 3C

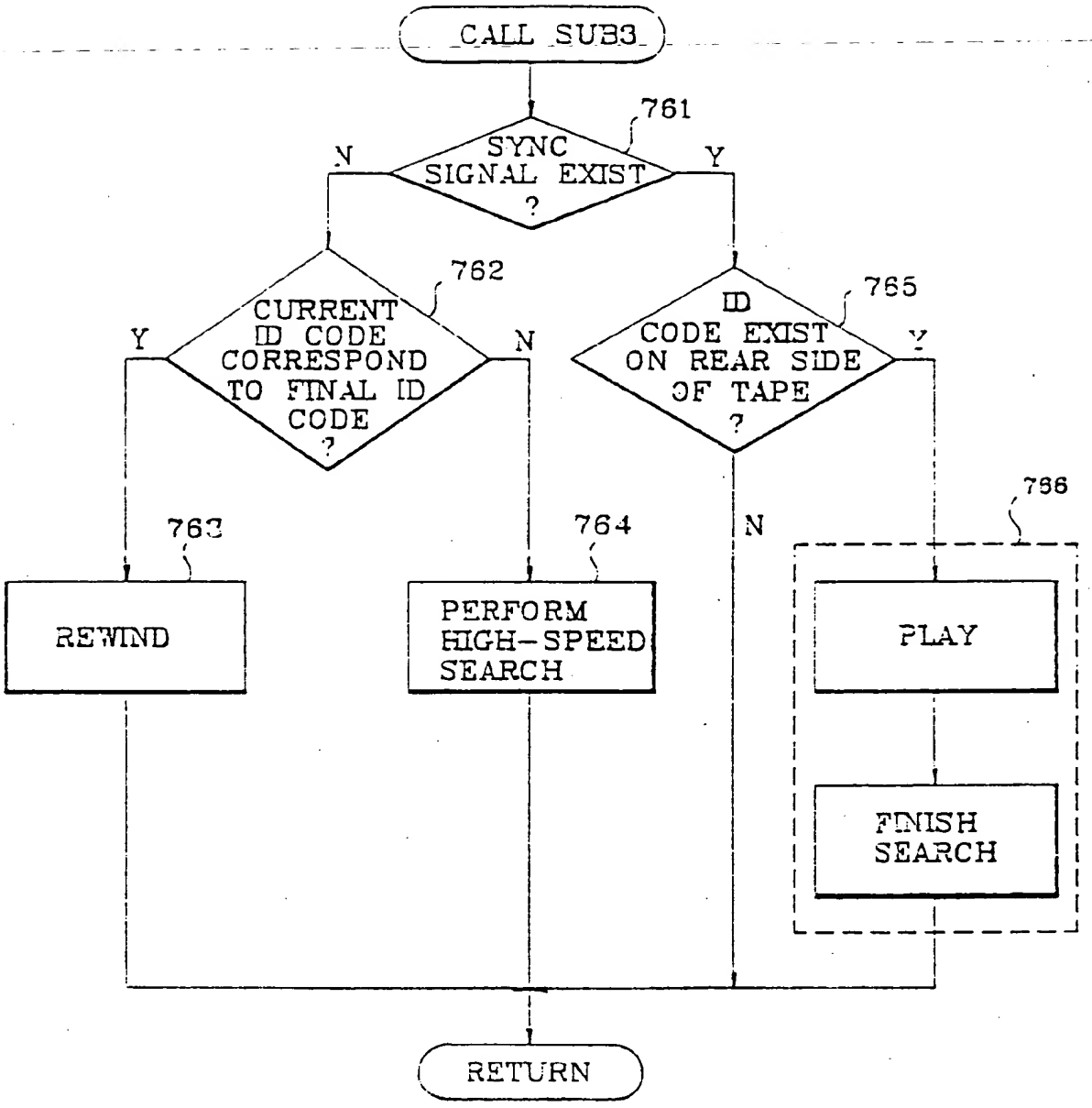

CALL SUB3
761
SYNC SIGNAL EXIST ?
N
Y
762
CURRENT ID CODE CORRESPOND TO FINAL ID CODE ?
Y
N
765
ID CODE EXIST ON REAR SIDE OF TAPE ?
Y
N
766
763
764
REWIND
PERFORM HIGH-SPEED SEARCH
PLAY
FINISH SEARCH
RETURN

FIG. 3D

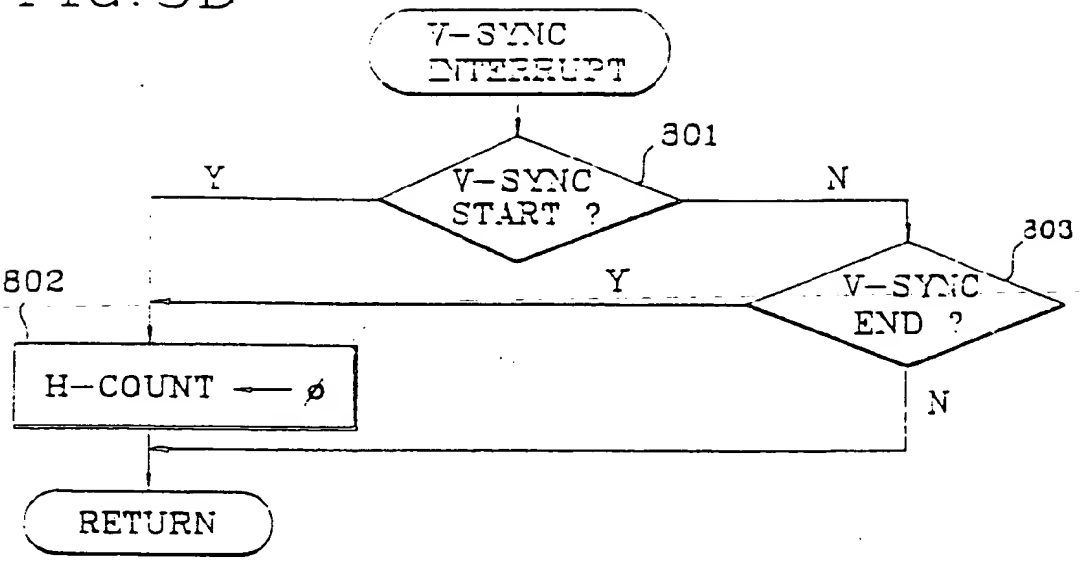

V-SYNC INTERRUPT
801
V-SYNC START ?
Y
N
803
V-SYNC END ?
802
Y
N
H-COUNT ← ø
RETURN

FIG. 3E

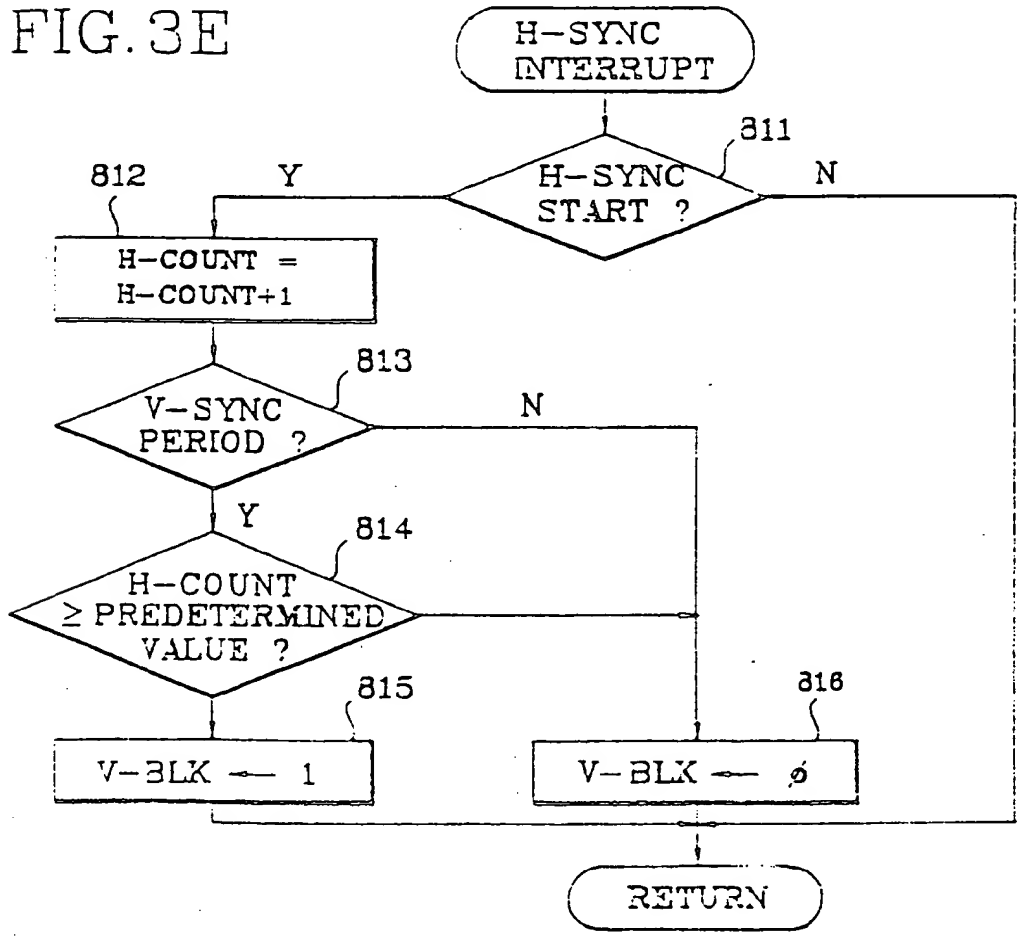

H-SYNC INTERRUPT
811
H-SYNC START ?
812
Y
N
H-COUNT = H-COUNT+1
813
V-SYNC PERIOD ?
N
Y
814
H-COUNT ≥ PREDETERMINED VALUE ?
815
816
V-BLK ← 1
V-BLK ← ø
RETURN

FIG. 4

TAPE ID CODE : X X X X			
ID CODE	ON/OFF TIME OF PROGRAM		TITLE
0001	10:00	11:00	PROGRAM-1
0002	8:00	9:00	PROGRAM-2
0003	6:00	7:00	PROGRAM-3
.	.		.
.	.		.
.	.		.
.	.		.
.	.		.
.	.		.

CURSOR POSITION

LIBRARY

FIG. 5A

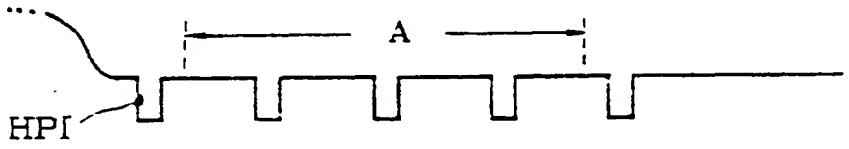
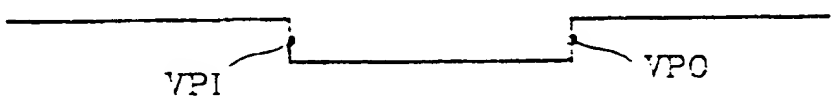


FIG. 5B



European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 93 30 6027

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X Y	EP-A-0 405 939 (SONY CORPORATION) * page 1, line 13 - line 47; figure 13 *	1,2 3-14	H04N7/087 H04N5/92 G11B27/30
Y	EP-A-0 472 147 (MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.) * column 1, line 29 - column 2, line 39 * * column 5, line 8 - column 7, line 35; figures 1-5 *	3-14	
Y	RADIO FERNSEHEN ELEKTRONIK vol. 40, no. 8, 1991, BERLIN, DE pages 465 - 468 WOLFGANG KORNHAAS 'Von der Textprogrammierung über TOP zum Archivsystem' * the whole document *	3-14	
Y	EP-A-0 257 534 (GRUNDIG E.M.V.) * the whole document *	3-14	
D,Y	US-A-5 097 348 (HIROYUKI SUETAKA) * column 1, line 19 - column 2, line 24; figures 1-4 *	3-14	TECHNICAL FIELDS SEARCHED (Int. Cl.5) H04N G11B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	01 JANUARY 1980	DUDLEY C.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P0601)